DETAILED ACTION

1. The Action is responsive to Applicants' Application filed April 16, 2004.

2. After a thorough search and examination of the present application, and in light of the following:

prior art searched and reviewed;

Examiner's Amendments made June 20, 2008 that was authorized to amend claims 1, 5, 6, 13, 20-22, 29 and 33; and

a update search on prior art conducted in domains (EAST, NPL-ACM, Google, NPL-IEEE, etc);

Claims 1-4, 6-20 and 22-42 (renumbered to 1-40) are allowed.

Examiner's Amendments

3. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to Applicants, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee. Authorization for this Examiner's Amendments, listed below was given on June 19, 2008 in a telephone interview with Mr. Jason F. Lindh, Registration Number 59,090.

3.1. Please amend claims 1, 5, 6, 13, 20-22, 29 and 33 as follows:

1. (Currently Amended) A method comprising:

building a data overlay as a data structure on top of a logical space included in a

distributed hash table (DHT) for a peer-to-peer system; wherein the logical space includes a plurality of DHT nodes having an associated plurality of DHT zones;

building, in the data overlay, a topology of a tree having a plurality of levels each including one or more tree nodes associated with respective said DHT nodes,

wherein:

the first level of the tree includes a single tree node having a single tree node zone corresponding to the entire span of the logical space of the DHT and being logically divided into a plurality of said tree node zones respectively corresponding to:

the tree nodes at each level of the tree; and

[[.]]parts of the logical space of the DHT;

each said tree node includes a key member which identifies a key associated with its respective tree node zone[[.]];

mapping a plurality of machines to the logical space of the DHT,

wherein:

each machine corresponds to one or more of more of the tree node zones; each machine selects as its representative node, from the one or more tree node zones corresponding thereto, the tree node corresponding to the largest size tree node zone; ~~and~~

each said representative node selects as its parent node another said representative node that is the representative node for an adjacent said tree node zone that has a larger size; and

wherein:

the single tree node zone that corresponds to the entire span of the logical space of the DHT is evenly divided into k tree node zones;

k is the number of tree nodes at the first level of the tree; and

the j-th tree node at level i of the tree has a tree node zone having:

a size of $[j/ k^i, (j+1)/k^i]$; and

a key of $(2j+1)12k^i$; where $(0<=j<2^i)$.

5. (Currently canceled)

6. (Currently Amended) The method as defined in Claim [[5]] 1, wherein:

each said key has a value that is a function of coordinates that identify the center of the respective tree node zone;

the i-th level of the tree contains k^i tree nodes; and

the tree node zone of each tree node has a size of $1/ k^i$.

13. (Currently Amended) [[.]]The method according to claim 12, wherein each link includes:

a first field that provides a hardwired pointer that points from a first object to a second object; and

a second field that provides a soft-state pointer that points from the first object to a DHT node which hosts the second object.

20. (Currently Amended) A computer readable store having stored thereon a data structure that comprises a data overlay as a data structure on top of a logical space included in a DHT for a peer-to-peer system[[;]], wherein:

the DHT governs the insertion and retrieval of objects into and from a peer-to-peer system;

the logical space includes a plurality of DHT nodes having an associated plurality of DHT zones;

the data overlay of the DHT is built by:

associating objects in the data structure with the DHT nodes; and

establishing links between the objects in the data structure;

the data overlay has a topology of a tree that includes a plurality of levels;

the tree includes a plurality of tree nodes associated with respective said DHT nodes;

the tree nodes include a root node having a tree node zone corresponding to the logical space of the DHT;

the tree node zone of the root node is logically divided into a plurality of tree node zones respectively corresponding to:

the number of tree nodes at each level of the tree; and

a part of the logical space of the distributed hash table;

each said tree node includes a key member which identifies a key associated with its respective tree node zone;

the logical space of the DHT is mapped to a plurality of machines;

each machine corresponds to one or more of more of the tree node zones;

each machine selects as its representative node, from the one or more tree node zones corresponding thereto, the tree node corresponding to the largest size tree node zone; ~~and~~

each said representative node selects as its parent node another said representative node that is the representative node for an adjacent said tree node zone that has a larger size; and

wherein:

the tree node zone of the root node is evenly divided into k tree node zones, where k is the number of tree nodes at the first level of the tree; and

the j-th tree node at level i of the tree has a tree node zone having:

a size of $[j/ k^i, (j+1)/k^i]$; and

a key of $(2j+1)12k^i$; where $(0<=j<2^i)$.

21. (Currently Cancelled)

22. (Currently Amended) The computer readable store as defined in Claim [[21]] 20, wherein:

each said key has a value that is a function of coordinates that identify the center of the respective tree node zone;

the i-th level of the tree contains k^i tree nodes; and

the tree node zone of each tree node has a size of $1/ k^i$.

29. (Currently Amended) A peer-to-peer system including a plurality of machines interacting in peer-to-peer fashion, comprising:

a logical space of a DHT that includes a plurality of DHT nodes having a plurality of associated DHT zones, wherein the DHT governs the insertion and retrieval of objects into and from the peer-to-peer system;

a data overlay as a data structure on top of the logical space of the DHT, wherein:

the data overlay of the DHT:

has objects in the data structure associated with the DHT nodes; and

has links established between the objects in the data structure;

the data overlay has a topology of a tree that includes a plurality of levels and includes a plurality of tree nodes associated with respective said DHT nodes;

the tree nodes include a root node having a tree node zone corresponding to the logical space of the DHT;

the tree node zone of the root node is logically divided into a plurality of tree node zones respectively corresponding to:

the number of tree nodes at each level of the tree; and

a part of the logical space of the distributed hash table;

each said tree node includes a key member which identifies a key associated with its respective tree node zone;

the logical space of the DHT is mapped to a plurality of machines;

each machine corresponds to one or more of more of the tree node zones;

each machine selects as its representative node, from the one or more tree

node zones corresponding thereto, the tree node corresponding to the largest size tree node zone; ~~and~~

each said representative node selects as its parent node another said representative node that is the representative node for an adjacent said tree node zone that has a larger size; and

wherein:

the tree node zone of the root node is evenly divided into k tree node zones, where k is the number of tree nodes at the first level of the tree; and

the j-th tree node at level i of the tree has a tree node zone having:

a size of $[j/ k^i, (j+1)/k^i]$; and

a key of $(2j+1)12k^i$; where $(0<=j<2^i)$.

33. (Currently Amended) An apparatus for building a peer-to-peer system, the apparatus comprising:

means for building a data overlay as a data structure on top of a logical space included in a distributed hash table (DHT) for a peer-to-peer system;

wherein:

the DHT governs the insertion and retrieval of objects into and from a peer-to-peer system;

the logical space includes a plurality of DHT nodes having an associated plurality of DHT zones; and

the data overlay of the DHT is built by:

associating objects in the data structure with the DHT nodes; and

establishing links between the objects in the data structure;

means for building a topology of a tree in the data overlay, the tree having a plurality of levels and including a plurality of tree nodes associated with respective said DHT nodes, wherein:

the tree nodes include a root node having a tree node zone corresponding to the logical space of the DHT;

the tree node zone of the root node is logically divided into a plurality of tree node zones respectively corresponding to:

the number of tree nodes at each level of the tree; and

a part of the logical space of the distributed hash table;

each said tree node includes a key member which identifies a key associated with its respective tree node zone;

means for mapping a plurality of machines to the logical space of the DHT, wherein

each machine corresponds to one or more of more of the tree node zones;

means for selecting as its representative node, from the one or more tree node zones corresponding to a respective said machine, the tree node corresponding to the largest size tree node zone; ~~and~~

means for selecting for each said representative node as its parent node another said representative node that is the representative node for an adjacent said tree node zone that has a larger size; and

wherein:

the tree node zone of the root node is evenly divided into k tree node zones, where k is the number of tree nodes at the first level of the tree; and

the j-th tree node at level i of the tree has a tree node zone having:

a size of $[j/ k^i, (j+1)/k^i]$; and

a key of $(2j+1)12k^i$; where $(0<=j<2^i)$.

Reason for Allowable

4. The following is the Examiner's statement of reasons for allowance:

In the searches for prior art conducted on EAST database, Examiner revealed the following three below listed references teach subject matter close to or similar to the instant application's claimed subject matter:

Bosley et al.: “SYSTEMS, METHODS AND PROGRAMMING FOR ROUTING AND INDEXING GLOBALLY ADDRESSABLE OBJECTS AND ASSOCIATED BUSINESS MODELS”, U.S. Patent Application Publication 2006/0218167, filed 5/26/2006 (a continuation of U.S. Patent Application 10/246,793, filed 9/18/2002) and published 9/28/2006, hereafter "Bosley”;

Tatemura et al.: “METHOD AND APPARATUS FOR DISTRIBUTED INDEXING”, U.S. Patent Application Publication 2007/0079004, filed 9/30/2005 and published 4/5/2007, hereafter "Tatemura"; and

Banerjee et al.: “RECONFIGURING A MULTICAST TREE”, U.S. Patent Application Publication 2005/0201278, filed 3/11/2004 and published 9/15/2005, hereafter "Banerjee".

Bosley teaches distributed indexing for providing dynamic insertion, lookup, retrieval and deletion of participating nodes, objects and associated matter; Banerjee focuses detecting service degradation from child node in a multicast network; and Tatemura discloses method for querying nodes on distributed network in which each node is stored with index tree.

Bosley, Banerjee or Tatemura individually or in combination fails to teach instant application's features of claimed subject matter, such as the following:

distributed hash table (DHT) for a peer-to-peer system; wherein the logical space includes a plurality of DHT nodes having an associated plurality of DHT zones;

a topology of a tree having a plurality of levels each including one or more tree nodes associated with respective said DHT nodes;

tree node having tree node zone corresponding to the entire span of the logical space of the DHT and being logically divided into a plurality of said tree node zones;

each said tree node includes a key member which identifies a key associated with its respective tree node zone; and

tree node zone that corresponds to the entire span of the logical space of the DHT is evenly divided into k tree node zones; where k is the number of tree nodes at the first level of the tree; and the j-th tree node at level i of the tree has a tree node zone having a size of [j/ k^i, (j+1)/k^i]; and a key of (2j+1)12k^i; where (0<=j<2^i).

An update search on prior art in domains (EAST, NPL-ACM, Google, NPL-IEEE, etc) has been conducted. The prior art searched and investigated in the domains (EAST, NPL-ACM, Google, NPL-IEEE, etc) do not fairly teach or suggest teaching of the subject matter as described and highlighted above and disclosed in each of the independent claims 1, 20, 29 and 33.

Claims (2-4 and 6-19), (22-28), (30-32) and (34-42) are directly or indirectly dependent upon the independent claims 1, 20, 29 and 33, respectively, and are also distinct from the prior arts for the same reason.

After a search and a thorough examination of the present Application and in light of the prior art, Claims 1-4, 6-20 and 22-42 (renumbered to 1-40) are allowed.

Conclusions

5. Any comments considered necessary by Applicants must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled “Comments on Statement of Reasons for Allowance”.

Contact Information

6. Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Kuen S. Lu whose telephone number is (571)-272-4114. The examiner can normally be reached on Monday-Friday (8:00 am-5:00 pm).
If attempts to reach the examiner by telephone pre unsuccessful, the examiner's

Supervisor, John Cottingham can be reached on (571)-272-7079. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for Page 13 published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, please call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

KUEN S. LU, July 2, 2008

Primary Examiner Art Unit 2167

/Kuen S Lu/
Primary Examiner, Art Unit 2167